[*J. Chem. Soc. Perkin 1.*, **1999**, 2165-2170 (1999)] [Lab. of Pharm. Synthetic Chemistry]

Recoverable Chiral Sulfoxide: Remote Asymmetric Induction in Lewis Acid-Promoted Diels-Alder Reaction of Chiral Sulfinyl-Substituted Pyrrolyl α, β-Unsaturated Enones.

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1[2-(*p*-Tolylsulfinyl)pyrrolyl α, β-unsaturated enones served as efficient dienophiles in the Diels-Alder reaction, where the use of aluminium chloride or a lanthanide triflate effected the cycloaddition with cyclopentadiene, affording the *endo* adduct with high diastereoselectivity. In particular, for the sulfinyl dienophile, the chiral auxiliary (*i.e.* the sulfinyl pyrrole) was recovered after use without any loss of optical purity.

[*Thin Solid Films*, **345**, 85-89 (1999)] [Lab. of Pharm.Physical Chemistry]

Plasma-Induced Free Radicals of Polycrystalline Carbohydrates as Spin Probe for Plasma Diagnosis of Plasma Treatment.

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In view of the fact that surface reactions of plasma treatment are initiated by plasma-induced surface radicals, study of such radicals is of utmost importance for understanding of the nature of plasma treatment. Since each parameter to specify the plasma eventually affects the intensity of plasma, "plasma power", to generate the surface radicals, we have examined to develop the method to deduce the plasma power useful for experimental and practical designs of plasma treatment. In the light of the special features of plasma-induced polycrystalline *myo*-inositol radicals, we report here that measurement of such a radical formation can be used as chemical diagnostic tool for plasma power.

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Specificities in Structures of Surface Radicals on Substituted Celluloses Produced by Plasma-irradiation.

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In this paper, we report the special features of plasma-induced free radicals of cellulose derivatives, being utilized as pharmaceutical excipients and food additives, such as carboxymethylcellulose (CMC), 2-acetamido-2deoxycellulose (Chitin) and 2-amino-2deoxycellulose (Chitosan), as studied by ESR coupled with the systematic computer simulations. One of the noteworthy features is that the observed ESR spectra of CMC radicals are largely different from the other two polycarbohydrates due to the presence of an acylalkyl radicals at the carboxymethyl side chain. Thus, it can be concluded that plasma –induced radicals formed in cellulose derivatives such as CMC, Chitosan including EC, HEC and HPC previously reported vary with the nature of substituents in a sensitive manner. We believe that these findings provide a basis for further application works in the preparation of new pharmaceutically useful materials as well as plasma treatment on a variety of glucose-based polycarbohydrates.

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Plasma-Induced Free Radicals of Polycrystalline Monocarbohydrates Studied by Electron Spin Resonance.

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We report here special features of plasma-induced free radicals of monocarbohydrates such as α-and β-glucose on its comparison with those of amylose and cellulose. The simulated spectra disclosed that the observed spectra of α-glucose consist of four kinds of spectral components, two isotropic spectra [doublet (I)and (II)], assigned to a hydroxylalkyl radicals and an anisotropic spectrum [anisotropic doublet (a-D) (III)], assigned to an acylalkyl radical, and a large amount of dangling-bond site (DBS) (V) with an intermediate level of conversion which includes a mixture of ring-opened and/or conjugated structure of no structural significance. On the other hand, those of β-glucose consist of four kinds of spectral components, I,III,V and an anisotropic doublet of doublets (a-DD) spectrum (IV) assignable to the acylalkyl radicals.